

## CLAIMS:

1. An image and data management system, comprising the steps of:

5 displaying an image;

producing, displaying, and positioning at least one graphical marker in at least one context of said image;

10 selecting at least one external data to associate to at least one of said graphical marker, wherein said external data is selected in one or a plurality of local or remote repositories.

15 associating at least one of said external data to at least one of said graphical marker and displaying a visual indication of said association.

saving information in one or a plurality of local or remote repositories, said information comprising at least data defining said association.

20 2. The method as claimed in claim 1 wherein said context is a region of interest, said region of interest being a user defined region composed of pixel values;

3. The method as claimed in claim 2 wherein defining a region of interest comprises the steps of:

25 providing a tool to the user for defining said region of interest;

interactively defining contour of said region of interest within said image using said tool, said contour being displayed in said image; and

30 automatically associating said pixel values of said user defined region to said graphical marker.

4. The method as claimed in claim 1 wherein said context is a region of interest, said region of interest being an automatically defined region composed of pixel values by means of an automated segmentation method.
5. The method as claimed in claim 4 further comprising automatically associating said graphical marker to said pixel values of said automatically defined region.
6. The method as claimed in claim 1 further comprising a means for displaying at least one of said external data.
7. The method as claimed in claim 1 wherein said step of producing, displaying and positioning said graphical marker is achieved automatically by means of a program.
8. A system for analyzing and managing image information, comprising:
- image input means for inputting an image;
  - image analysis program for automatically identifying and quantifying objects of interest within said image, said program producing image information;
  - association program for associating multi-source information to said image and said objects of interest, said step of associating producing associative information;
  - display program for displaying said image, at least some of said multi-source information, and for producing and displaying graphical information in context of said objects of interest of said image; and
  - storage means and program for storing said image, said image information, said graphical information, and said associative information in local or remote repositories.
9. The method as claimed in claim 8, further comprising the steps of:

automatically searching one or a plurality of said repositories for images that satisfy one or a plurality of data-mining criteria, said data-mining criteria being manually or automatically defined;

5 automatically producing and displaying searching results, said searching results composed of at least a list of found images.

selecting and displaying at least one of said images from said mining results by activating at least one element of said list, wherein said displaying comprises  
10 emphasizing said objects of interest of said selected images.

10. A method for providing object-based image discovery, comprising:

15 image input means for inputting an image;

image analysis program for automatically identifying and quantifying objects of interest within said image, said program producing image information, said image and said image information stored in at least one repository;

20 a user input means for inputting a discovery criteria;

a searching program for searching within said repositories for images that satisfy said discovery criteria;

25 a display means for displaying searching results and said images.

11. A method for automatic spot detection in digital images, comprising the steps of:

reading an image;

30 computing statistical distribution of noise information in said image;

computing a multiscale analysis level N in accordance to said statistical distribution;

computing a multiscale image of said image up to said level N, and generating at least one type of regionalization of said multiscale image;

5 identifying objects of interest in said image in correspondence with said multiscale image and said regionalization;

identifying organized structures in said image said organized structures not objects of interest; and

10 characterizing and classifying said objects of interest.

12. A method for automatically attributing a confidence level to one or a plurality of spot objects in a digital image, comprising the steps of:

15 reading an image;  
automatically identifying spot objects in said image;  
computing confidence level of said spot objects;  
displaying confidence level for at least one of said spot objects.

20 13. A method for characterizing spot objects in an image, comprising:

means for computing a multiscale representation of said image up to a level N, wherein said step of computing providing a multiscale image;

25 means for identifying and defining spot object regions on each of said levels of said multiscale image;

means for linking said spot object regions identified on each of said levels of said multiscale image, said linking creating a multiscale event tree, said multiscale event  
30 tree providing information for characterizing and classifying said spot objects.

14. The method as claimed in claim 11, wherein said step of characterizing is achieved by means of claim 13.

15. The method as claimed in claim 11, wherein said step of classifying is achieved by means of an artificial neural network.
- 5 16. The method as claimed in claim 11, wherein said organized structures are smear lines.
17. The method as claimed in claim 11, wherein said organized structures are image artifacts, said image artifacts including air bubbles, hair, rips, and scratches.
- 10 18. The method as claimed in claim 13, wherein said spot object regions are watershed regions.
19. The method as claimed in claim 4, wherein said automated segmentation method is provided by method of claim 11.
- 15 20. The method as claimed in claim 8 and 10, wherein said image analysis program is the method of claim 11.
- 20 21. The method as claimed in claim 12, wherein said step of automatically identifying is achieved by means of the method of claim 11.
22. A method for quantifying identified spot objects, comprising the steps of:
- 25     computing one or a plurality of 2D diffusion functions;
- fitting said diffusions functions to said identified spot objects by varying parameters of said diffusion functions in order to optimize said fitting, said parameters providing the variance, width and height of said diffusion functions;
- 30     simulating and calculating cumulative effect of said identified spot objects by means of said diffusion functions; and

quantifying said identified spot objects without said cumulative effect by means of said diffusion functions.